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TESTS OF PIMA EGYPTIAN COTTON IN THE SALT RIVER VALLEY, ARIZONA.

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ORIGIN OF THE PIMA VARIETY.

The United States Department of Agriculture began experimenting with Egyptian cotton in Arizona in 1901. After seven years of plant-breeding work a new variety, which received the name "Yuma," was developed. The results of field tests, extending over a period of four years, together with spinning tests of the fiber, having indicated that this cotton was suitable for commercial production, seed was placed in the hands of farmers in the Salt River Valley, Ariz., in 1912. The Yuma variety has ever since been grown in that locality,[1] the production of 1916 being estimated at from 4,000 to 5,000 bales.

The Pima variety originated in 1910 with a plant selected out of a field of Yuma cotton grown at the Cooperative Testing and Demonstration Garden at Sacaton, Ariz. This variety is very distinct from the parent Yuma variety and in certain respects is decidedly superior.

COMPARISON OF THE PIMA AND YUMA VARIETIES.

When compared with typical plants of the Yuma variety, Pima shows the following differences: The limbs, or vegetative branches, are fewer and shorter; the leaves are more regularly five-lobed and the clefts between the lobes are deeper; the bolls are less tapering and have sharper points and a much smoother surface, the Yuma boll being deeply pitted; the Pima fiber is finer, lighter colored, and longer, stapling from $1\frac{5}{8}$ to $1\frac{3}{4}$ inches, while the Yuma fiber averages from $1\frac{1}{2}$ to $1\frac{9}{16}$ inches. The peculiar shape and smooth surface of the Pima boll afford the readiest means of distinguishing the plants from those of the Yuma variety.

The Pima plants are more productive than the average plant of the Yuma variety, the fruiting branches, especially the lower ones,

[1] Scofield, C. S., Kearney, T. H., Brand, C. J., Cook, O. F., and Swingle, W. T. Community production of Egyptian cotton in the United States. U. S. Dept. Agr. Bul. 332, 30 p. 1916.

being longer and better furnished with bolls. For this reason and because of the lesser tendency to rank upward growth, the plants mature earlier than those of Yuma. The more open foliage and the smaller development of limbs allow more light to reach the lower part of the plant, and consequently the early bottom crop is heavier. This would be an especial advantage in years when the season is cut short by early frosts.

The strong tendency of the Pima plants to develop fewer and shorter limbs than the Yuma plants gives the former variety a decided advantage by making the picking easier. A further advantage consists in having a larger proportion of the bolls borne on the branches of the main stalk instead of on the limbs. With a very long season the average plant of Yuma might ripen as many bolls as the average plant of Pima, but in ordinary years many of the bolls borne on the large limbs of the Yuma plants do not have a chance to mature, and the bottom crop being largely "shaded off," a smaller production results.

The bolls of Pima cotton are plumper and better filled than the average Yuma boll, and Pima is, therefore, superior in weight of seed cotton per boll. Consequently, with the former variety the picker secures a somewhat larger return for his labor. In lint percentage the two varieties differ but slightly, the advantage, if any, being in favor of the Yuma.

The Pima cotton produces a longer and finer fiber than the Yuma and for this reason should command a better price in the market; but even if there were no difference in the value of the fiber, the superiority of the Pima variety in productiveness, earliness, size of bolls, and greater freedom from limbs is likely to make it the more profitable type to grow.

GREATER UNIFORMITY OF PIMA COTTON.

In the present condition of the two varieties Pima is much the more uniform, having had the advantage of improvements in the methods of cotton breeding which have taken place since the Yuma variety was turned over to the growers. This difference in uniformity was apparent last summer to the growers of Pima cotton in the Salt River Valley, all of whom had grown the Yuma variety in previous years. In the Yuma fields it is easy for anyone who is at all familiar with the cotton plant to pick out several types which differ in general appearance and in the shape of the leaves and bolls. In the Pima fields, on the other hand, only one type of plant is present.[1]

[1] Agents of the United States Department of Agriculture who rogued the seed-increase fields of both varieties in the Salt River Valley last summer removed about 15 plants in every thousand of the Yuma variety, but only about two plants in every thousand of the Pima variety. Moreover, the "rogues" in the Yuma field were much more conspicuously "off type" than those in the Pima fields. If the Yuma had been rogued as severely as was the Pima, it is probable that 10 per cent of the total plants would have been removed.

The individual plants of the Yuma variety also show marked differences in length of fiber, while the Pima plants are much more uniform in this respect. With a long-staple cotton this matter of uniformity is very important and is a large factor in the value of the cotton to the spinner.

FIELD TEST OF PIMA COTTON IN 1916.

The Pima variety seemed to be so promising that in the spring of 1916 arrangements were made for a field test in cooperation with the Salt River Valley Egyptian Cotton Growers' Association. Three strains of the Pima variety, each derived from a single selected plant, were included in this test. These strains differ so slightly that up to the time this cooperative planting was made no decision had been reached as to which is the best of them. It was therefore considered desirable to plant an acreage of each strain large enough to afford a thorough comparison of their behavior under the soil conditions of the Salt River Valley and to furnish sufficient fiber for a comparative spinning test. In order to prevent any possibility of mixing the different strains before it could be definitely determined which one should be commercially grown, the United States Department of Agriculture retained an option on all the seed to be produced in these fields. Contracts were executed binding the farmers who received this first supply of Pima seed to follow the instructions of accredited agents of the department in regard to the preparation, planting, cultivation, and irrigation of the land and the thinning, roguing, and harvesting of the crop.

A number of farmers in the Tempe district accepted the terms offered by the department and planted in all some 275 acres of Pima cotton in March, 1916. With the hearty cooperation of the association the seed cotton from these fields has been picked and ginned, with adequate precautions to keep the three strains separate and to prevent admixture of other cotton seed.

PLANTING PIMA COTTON IN 1917.

It is estimated that the 275 acres of Pima cotton grown in the Salt River Valley in 1916 will yield about 200,000 pounds of seed. In view of the demand which is anticipated for this type of cotton, the seed should be planted in 1917 under such conditions as will insure the greatest possible increase. It is desirable, however, that there be held in reserve a sufficient quantity not only to meet the ordinary requirements of replanting but to provide against the occurrence at planting time of exceptionally unfavorable conditions, such as a severe late frost or a heavy rainstorm, which might cause crusting of the ground so as to prevent germination.

Furthermore, if this limited supply of seed were distributed to growers scattered throughout the valley, much of it would be planted

in the vicinity of fields of Yuma cotton. Cross-pollination due to insects coming from these fields and the accidental mixing of the seed cotton in wagons, bins, and ginning plants would inevitably take place, with the result that much of the seed produced would be unsuitable for planting in 1918.[1] For these reasons it is imperative that the Pima seed be planted next year in a continuous area where no other variety of cotton is grown. This is the only means of insuring a supply of perfectly pure seed large enough to plant the entire cotton acreage of the valley in 1918, in the event that it should prove desirable to effect a complete substitution of Pima for Yuma cotton.

The carrying out of this policy will involve temporary disappointment to many farmers in different parts of the Salt River Valley who have good land and have shown their ability to grow excellent crops of Egyptian cotton. On the other hand, in order to provide a solid block of Pima large enough to supply the quantity of pure seed which may be required in 1918 it will be necessary to plant with this variety many acres of comparatively poor soil, as it would be impossible to find an area of several square miles in which there is no inferior land. Unless supplied with Pima seed the owners of such land would in all likelihood plant Yuma rather than refrain from growing any cotton whatever.

It is also likely to be necessary to confine the Pima acreage in 1917 to the territory of a single association, in order to provide for ginning under such conditions as will guard against mixing the seed. When two varieties are grown in a community served by one ginning establishment it is necessary in order to avoid mixing the planting seed to stop work and thoroughly clean out the plant before the second variety is put through the gins, and this must be repeated for each picking. Experience has shown that this procedure entails a great deal of labor and expense, and, moreover, it is doubtful whether the work can be done thoroughly enough to eliminate all possibility of seed mixture. If the Pima seed is planted in only one community and constitutes all or the bulk of the crop in that community, the expense will be greatly reduced, and the danger of getting the Pima seed mixed with Yuma will be avoided. It is, therefore, very much to the interest of all cotton growers in the valley that the Pima acreage in 1917 be confined to a single community.

Approved:

WM. A. TAYLOR, *Chief of Bureau.*

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[1] For a fuller discussion of the precautions necessary to maintain a pure supply of seed, see Seed selection of Egyptian cotton, U. S. Dept. Agr. Bul. 38, 1913.

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